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"THE TRUE PLAN FOR

Improving the Port of Washington

and at the same time

ITS SANITARY CONDITION."

The true plan for improving the Port of Washington, and at the same time its sanitary condition, will be found in the following extract from a report of Mr. Alfred L. Rives, an accomplished Civil Engineer, made on the 5th of February, 1857, to the Secretary of the Interior of the United States, "under a resolution of "Congress calling for plans and estimates for permanent bridges "across the Potomac," and which very naturally and properly commences as follows:—

WASHINGTON, *February 5, 1857.*

SIR: I have the honor to submit to you the following report as the result of my labors in carrying out the resolution of Congress calling for plans and estimates for permanent bridges across the Potomac. For the precise nature and condition of the duty assigned me, I beg leave to refer to the communication addressed to me from the Department of the Interior, under the date of the 13th of September last, which is herewith annexed, marked "A." The very limited time allowed me will, I hope, excuse any omission of details that might otherwise have been properly presented.

It is evident that plans for a permanent bridge at Washington cannot be properly matured without a due regard to the interests of navigation, nor should the equally vital and important question of railway communication be overlooked. A thorough examination of the river and adjacent country was, therefore, deemed indispensable. A complete hydrographic survey, (see accompanying map,) extending a distance of six miles—from the island rocks, called the *Three Sisters*, (a half mile above Georgetown,) to Geesborough Point, (one mile below the arsenal)—established conclusively that some improvement in the actual state of the river is imperatively demanded. The depth of the Potomac at the *Three Sisters* is eighty-four feet, and thence to a quarter of a mile below Easby's wharf varies from twenty-one to thirty-three feet. Below that point the current spreads itself over an immense surface, gradually losing its energy, until the channel presents a depth of only ten feet at mean, and eight feet at extraordinary low tides. As the tide rises only three feet, this depth is wholly inadequate for the purposes of navigation. Further on, the causeway of the Long bridge so contracts the current, that we again find a depth of thirty-two feet. Below the Long bridge there exists two channels—the Georgetown or Virginia, and the Washington or City channel. The former is by far the more

considerable, until the tides of the Eastern branch exert their beneficial influence on the latter. After the junction of the two channels, the water attains a depth of fifty-four feet.

It will be seen from this description, that there are flats separating the Washington and Georgetown channels, and extending as far as the Eastern branch. It has been very common to assume that these flats owe their origin to the causeway constructed to facilitate the erection of the Long bridge. This, however, seems to me a singular confusion of cause and effect. The causeway resulted from the flats, not the flats from the causeway. There existed originally a channel through their midst, which, with or without the Long bridge causeway, must eventually have disappeared as a consequence of the permanent connection of Mason's or Analostan island with the Virginia shore. Examination of old charts, as well as reflection upon the necessary operations of nature, convince me that these flats date from a period long antecedent to the erection of the causeway. That they have increased more rapidly during the past fifty years is but natural, when we consider what vast deposits must result from the freshet waters of the Potomac, now rendered doubly turbid from washing the shores of a highly cultivated region. It must be evident that ploughed hill-sides furnish more alluvial deposit than unbroken forests or grassy slopes. By the operation of these and similar causes, many ports, formerly deep and accessible, now scarcely exist, of which Bladensburg, in our immediate vicinity, and others on our rivers of the Atlantic seaboard, are familiar examples.

In many cases this state of things admits of no remedy without great and continued expenditures. The case of the Potomac at Washington is happily different. Here the volume of water is amply sufficient, when properly directed by one initial expenditure, to insure good and lasting navigation. So long, however, as its energies are wasted by diffusion over a large surface, we must expect a changeable and insufficient channel. I have, therefore, prepared the following plan, requiring comparatively small expenditures, and which I deem certain in its operation, and leading to most enduring and beneficial results. It is but the completion of a work commenced by nature. It consists in opening a clear water-way of 1,770 feet along the Washington shore by removing a portion of the existing causeway, and replacing it temporarily by a wooden structure on piles; lowering the dam connecting Mason's island with the Virginia shore, so as to bring it on a level with extraordinary high tides, and terminating its upper surface by an inclined plane of masonry; dredging a short new channel across a portion of the flats; building a breakwater from the southern

point of Mason's island to deflect the current of the river into the new channel; and, finally, reclaiming 166 acres of the flats at the mouth of the Tiber, thus giving a continuous and deep channel along the Washington shore. The Tiber, or more properly, the City canal, should be continued to the new shore line, and guard-locks be placed at its entrance into the river. The outlines of this plan are exhibited on the accompanying map.

The advantages resulting from these arrangements may be summed up as follows:

1st. The permanent improvement of navigation. I say permanent, because the river will be confined in a sufficiently narrow channel for three-quarters of a mile below Easby's wharf by the proposed breakwater, which it leaves in a direction normal to the Long bridge, finally passing directly through the opening reserved for it, and becoming tangent to a bold curved shore of wonderfully regular outline. It is well known that currents in curves form stable and deep channels. The current we have to deal with below the Long bridge can never be of such violence as to form an exception. A remarkable corroboration of this fact may be found by referring to a map of the Potomac published as far back as 1792. The old *swash* channel, formerly of considerable magnitude, showed no disposition to deflect, although striking somewhat obliquely against the Washington shore. On the contrary, it followed its curved outline with willing mathematical precision. An examination of the accompanying map must convince any unprejudiced mind that the proposed new channel cannot by any possibility injure, and will in all probability improve, the mouth of the Eastern branch, on which the United States have very important interests connected with the navy. Lower than this, it is obvious the regime of the river cannot be affected by the proposed changes.

It may be objected that there, perhaps, exists some natural obstacle to forming a channel across the flats. Fearing an objection of this nature, I thought it well to ascertain positively, the character of the alluvial deposit. For this purpose I caused to be constructed a simple wooden rod, pointed with iron. Two men forced it down a depth of twenty feet below mean low tide in no less than fifteen spots taken over the surface proposed to be appropriated to the new channel. This test settles completely and conclusively the question of feasibility. A preliminary channel one hundred feet wide, twelve feet deep at mean low tide, connecting the Washington channel with the deep water off Easby's wharf, could be easily and promptly dredged. The current would soon do the rest. It is confidently believed that by constructing the breakwater in sections, the amount to be dredged can

be greatly diminished. For this purpose it is proposed to make the breakwater, in the first instance, only to the Virginia channel, there leaving a passage-way of one or two hundred feet for navigation while prosecuting the remaining portion of the work on the other side. The present Virginia channel would be thus temporarily improved where it is most defective, and yet a large proportion of the descending current would be deflected to the Washington shore, and exert its force in completing the work commenced by the dredging machine. The moment the new channel shall present the required facilities for navigation, the opening reserved in the breakwater should be finally closed, which would be done most judiciously, perhaps, when navigation is suspended during the intense frosts of winter. The result of these combined operations would give, instead of the unsightly and unhealthy flats along the Washington shore, a new and deep channel of incalculable benefit to both Washington and Georgetown.

It has been sometimes suggested to divide the current, sending one portion along the Washington and the other along the Virginia shore. However great an improvement this may be on the present state of the river, it must still be evident that one good channel is infinitely preferable to two inferior ones. It has also been proposed to fill out the river from the Washington shore to the Virginia channel. This project would require many years to realize, be of immense expense, remove commercial facilities to a great distance from the present centres of business, and might seriously compromise the actual regime of the river below the arsenal.

2d. The health of a large portion of the city would be greatly benefitted by the double effect of removing the flats and improving the sewerage. The construction of guard-locks at the mouth of the Tiber would perfectly protect the city from the consequences of inundations, which are now a source of great annoyance. It seems a strange anomaly that the Presidential Mansion should crown a hill, terminating in a pestilential flat, on which a large portion of the sewerage of the city is cast to fester in the sun and generate unwholesome miasma. Its removal has, consequently, been sometimes suggested, the expense of which would be more than sufficient to realize all the improvements now proposed.

3d. If it should be determined to erect a permanent bridge at the site of the Long bridge, the proposed plan would diminish its cost by nearly one-half, as a large portion of the structure may be simply causeway. If there is to be no permanent bridge at this location, the citizens of Washington should possess, at least, the facilities afforded by a ferry. In the actual state of the river that privilege is denied, at

ordinary low water, to the lightest row-boat. To pass from Washington to Georgetown by water, it is necessary to turn the point of alluvial deposit, below the arsenal, in order to ascend the Virginia channel—a distance of two miles being thus drawn out to six.

4th. By the proposed modification of the dam connecting Mason's island with the Virginia shore, we should secure all of its advantages without experiencing any of its evil effects. In all ordinary stages of the river it would force the whole current around by Georgetown, thus keeping its channel free. In times of dangerous freshets it would act as a safety-valve by largely increasing the water-way, thus depressing the level of the river on its passage by the neighboring cities, and greatly diminishing the injurious effects of inundations, more especially in Georgetown. At the same time the formation of marshes along the Virginia shore would be prevented. It would, of course, be necessary to leave a permanent and suitable passage for the water through any causeway that might be constructed at the site of the Long bridge. By means of the modification here recommended, the dam at the head of Mason's island would become an immense waste weir of great stability; its sloping surface would act as an ice-breaker, while its lessened height would preserve it from the angry violence of the swollen waters of the Potomac, which, on a previous occasion, effected its destruction.

5th. The expenditures necessary to secure the advantages enumerated above will not amount to one-sixth part of the value of the land reclaimed, the greater portion of which, I presume, will belong to the United States, as three reservations and one street front on it. By referring to the accompanying estimates, (marked B,) it will be seen that the cost of removing a portion of the Long bridge causeway, replacing it temporarily by a wooden structure, depressing the dam at Mason's island, dredging a new channel, and building a breakwater from the island, amounts to $108,367. If, in addition, we construct a guard-lock at the mouth of the Tiber, and reclaim 166 acres of land by raising the level of the flats six feet and facing them with a more elevated dike, the total expenditure will amount to $602,477, equal to $8\frac{3}{10}$ cents per superficial foot. This sum could be very considerably diminished by making arrangements to retain the alluvial deposit. It would require, however, a series of years to realize very material results from such a system. Should more expeditious means be thought advisable, the earth required could be procured by grading the contiguous portions of the city, thus securing a double benefit. The value of this land, at a reasonable estimate, possessing as it would great commercial facilities, cannot be less than fifty cents per superficial foot, or, in the

aggregate, $3,615,480, which, as before stated, is six times the expenditure in question.

For each and all of these reasons I feel no hesitation in recommending prompt and efficient measures for the improvement of the river in the manner herein indicated. Knowing the possible doubts which might exist, in some quarters, as to the efficacy of the plan proposed, however clear my own convictions of its certain success, I have felt it my duty to consult with some of the highest engineering authorities of the country on the subject, and they concur in the opinion that the plan is safe, feasible, eligible in itself, and, what is also important, susceptible of rapid realization, without interfering in any way, or at any time, with the general interests of navigation, or with the convenience of the travelling public.